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A new species and a new record of *Anthostomella* on *Alnus* leaf-litter from Argentina

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Abstract — A study on saprobic fungi occurring on litter of *Alnus acuminata* from northwestern Argentina yielded an unknown *Anthostomella* species (described here as *Anthostomella saltensis*) and the first record of *A. scotina* for Argentina. A table is provided comparing *A. saltensis* with similar species.

Key words — *Ascomycota, Betulaceae, Xylariaceae,* Yungas

Introduction

There have been few investigations on the genus *Anthostomella* in Argentina. The main publications are those by Spegazzini (1880, 1881, 1887, 1899, 1910, 1915) recording eight species, of which only four are currently accepted: *A. achira* (Speg.) Speg., *A fuegiana* Speg., *A. sphaeroidea* Speg., and *A. sepelibilis* (Berk. & M.A. Curtis) Sacc. Lu & Hyde (2000) synonymized or excluded the remaining species, treating *A. nummularioides* Speg. and *A. phoenicicola* Speg. as synonyms of *A. tenacis* (Cooke) Sacc. and *A. platensis* Speg. as a synonym of *A. tumulosa* (Roberge ex Desm.) Sacc. and excluding *A. lonchosperma* Speg. from the genus. Additionally, they synonymised *Phaeophomatospora argentinensis* Speg. with *Anthostomella limitata* Sacc., *Anthostoma yatay* Speg. with *Anthostomella dilatata* (Berk. & Broome) Petch, and *Entosordaria fuegiana* Speg. (nom. illeg.) with *Anthostomella phaeosticta* (Berk.) Sacc. Lu & Hyde (2000) also cited a collection from Argentina on a *Bromelia* sp.

when they proposed the new species *Anthostomella rhaphidophylli* B.S. Lu & K.D. Hyde. An erroneous record of *A. tomicoides* Sacc. from Argentina (Lu & Hyde 2000: 188, as *A. italica* Sacc. & Speg.) is based on a Spegazzini collection from Bellano, Italy.

Recently, Capdet (2012) has reported *Anthostomella nitidissima* (Durieu & Mont.) Sacc., *A. palmaria* B.S. Lu & K.D. Hyde, *A. puiggarii* Speg., and *A. spiralis* K.D. Hyde & B.S. Lu on fallen woody parts of native palms from Argentina.

Overall, fourteen species growing on herbaceous plants (*Cannaceae*, *Juncaceae*, *Agavaceae*, *Apiaceae*, *Smilacaceae*, *Asparagaceae*) and woody parts of palms (*Arecaceae*) (Lu & Hyde 2000, Capdet 2012) have been reported so far from Argentina.

Alnus acuminata Kunth ("aliso del cerro"; *Betulaceae*) is a tree species present from northern Mexico to northwest Argentina (www.theplantlist.org). It is the dominant plant of the Argentina Yungas at the highest altitudes between 700 and 1500 m.s.l. (Zuloaga & Morrone 1999). Little is known about *Xylariaceae* on *A. acuminata*. Sir et al. (2012) recently reported *Hypoxylon rubiginosum* var. *microsporum*, *Xylaria luxurians*, and *X. mellissii* from Tucumán province (Argentina), but no *Anthostomella* species have been recorded on this host.

The present work deals with *Anthostomella* species collected in leaf-litter of *Alnus acuminata* during a survey of the *Xylariaceae* within the Argentine Yungas. We propose a new species and record *A. scotina* for the first time for the country.

Materials & methods

The sampling area (23–29°S 64–68°W) is part of the 'Yunga' phytogeographic region (Cabrera 1971) in northwest Argentina, involving the Salta, Jujuy, Catamarca, and Tucumán provinces (Sir et al. 2012: fig. 1). Microscopic preparations and observations, terminology, and the criteria used for descriptions follow Lu & Hyde (2000) and Francis (1975).

Taxonomy

Anthostomella saltensis Sir, Hladki & A.I. Romero, **sp. nov.** Plate 1

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Differs from *Anthostomella clypeata* by its slightly smaller, inequilaterally ellipsoidal ascospores with a germ slit extending the full length of the spore.

Type: Argentina, Salta, Department Santa Victoria, National Reserve El Nogalar de los Toldos, 27-XII-2011, Sir & Hladki 118 (**Holotype**, LIL).

Etymology: "saltensis" refers to the name of the Salta province.

Ascomata perithecate, immersed, clustered or solitary, visible as black and conical areas, dome-shaped in vertical sections (183–)186–250(–274) × (188–)

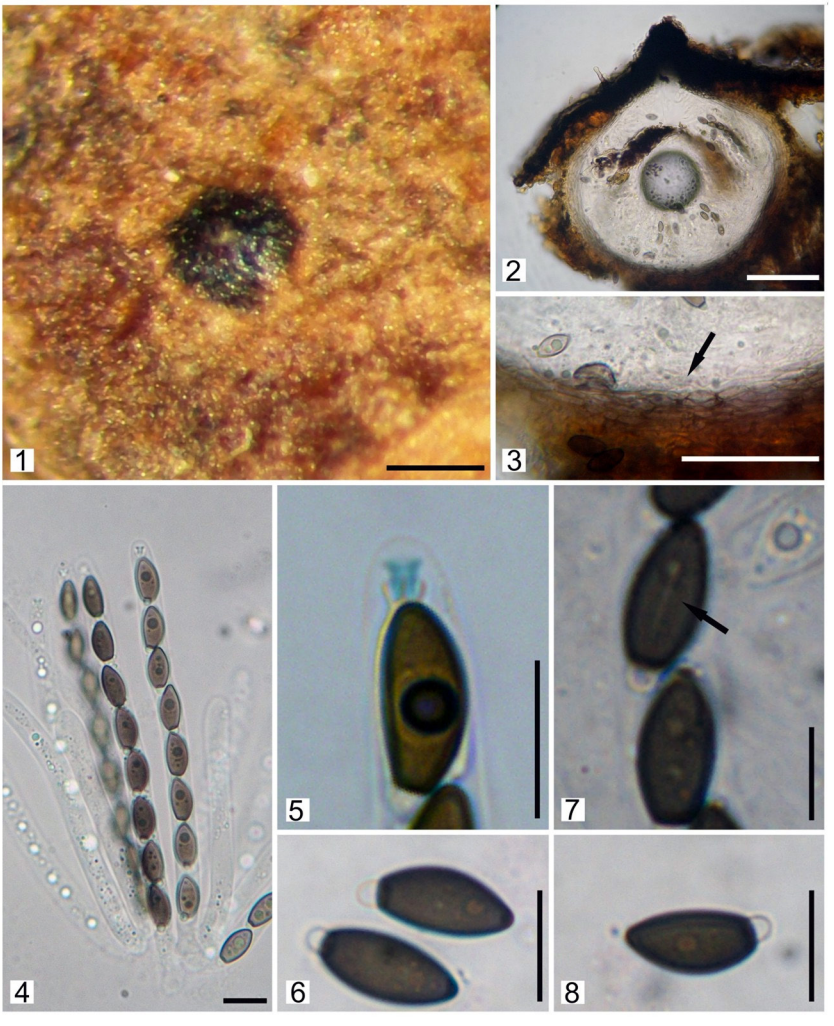

Plate 1 (Figs 1–8). *Anthostomella saltensis* (Holotype). 1: Clypeus on surface of *Alnus acuminata* leaf; 2: Longitudinal section of immersed perithecium; 3: Peridium (arrow); 4: Asci; 5: Ascal apical apparatus; 6, 8: Ascospores; 7: Ascospores showing germ slit. Bars: 1 = 200 µm; 2, 3 = 100 µm; 4–8 = 10 µm.

193–250(–273) µm (x = 225 × 222.8 µm, n = 11). Clypeus black, (160–)162.5–250 (–314) µm diam. (x = 208.6 µm, n = 11); ostiolar papilla (30–)37–60(–61) µm diam. (x = 47.7 µm, n = 11), periphysate ostiolar canal 27 µm broad. Peridium

10–16.5 µm thick (x = 14 µm). Asci cylindrical, unitunicate, 8-spored, short-pedicellate (64–)68–97(–98) × (5–)5.5–7.5(–8) µm (x = 83.2 × 6.1 µm, n = 50), apically rounded with IK+ apical ring inverted hat-shaped, 2–3 × 1-2 µm (x = 2.1 × 1.7 µm, n = 50). Paraphyses septate, hyaline, 2–5(–5.5) µm diam. (x = 3.5 µm, n = 50). Ascospores (9–)9.5–13(–14) × 4–5.5(–6) µm (x = 11.2 × 4.9 µm, n = 100), two-celled with a hyaline globose basal cell, 1–2 × 1.5–2(–2.5) µm (x = 1.4 × 2 µm), and a larger brown cell, 8–11(–12) × 4–5.5(–6) µm (x = 9.5 × 4.8 µm), inequilaterally ellipsoidal, usually with narrowly rounded ends, with one end narrowly rounded and the other end truncate; germ slit straight extending over the full length, ventral. Mucilaginous sheath lacking.

Host — leaf-litter of *Alnus acuminata*.

Distribution — Argentina (Salta province).

Additional material examined — **ARGENTINA, Salta**, Department Santa Victoria National Reserve El Nogalar de los Toldos: near the river, 26-VI-2013, Sir & Hladki 499 (LIL); road to the National Park Baritú, 28-XII-2011, Sir & Hladki 119 (LIL); 27-VI-2013 Sir & Hladki 500 (LIL). **CHILE, Los Rios,** Valdivia, on leaves and stems of *Uncinia erinacea*, Jan. 1909, C. Spegazzini (LPS 6537, holotype of *Paranthostomella unciniicola*).

Notes — Table 1 summarizes the morphological differences between *Anthostomella saltensis* and the three most similar *Anthostomella* species. *Anthostomella saltensis* is close to *Anthostomella clypeata* (De Not.) Sacc. as described by Lu & Hyde (2000), but our examination of the holotype of *Paranthostomella unciniicola* Speg. (considered a synonym of *A. clypeata* by Lu & Hyde 2000) revealed differences between the Argentine collection and the accepted concept of *A. clypeata*. *Anthostomella clypeata* differs from *A. saltensis* by its ascospores being equilaterally ellipsoidal, without a germ slit, and slightly larger (x = 13.3 × 5.3 µm; Lu & Hyde 2000). Another allied species, *A. clypeoides* Rehm, has ascospores of a similar size and shape, but they lack a germ slit, have brown cells with one conic end, and are surrounded by a thin mucilaginous sheath (Lu & Hyde 2000). *Anthostomella sabinianae* S.M. Francis is also similar but has larger ascospores with one end widely rounded.

As *Anthostomella* spores do not easily germinate, cultures are not available and few sequences are registered at GenBank (http://www.ncbi.nlm.nih.gov/), making molecular comparisons impractical. There is no phylogenetic study on the genus available at present. Most new taxa have been based on morphological characters (Lu & Hyde 2000; Lee & Crous 2003). There are a few general studies on some *Anthostomella* sequences such as Zhang et al (2006) and Pelaez et al. (2008), and sequences have been generated for five species by Lu & Hyde (2000) and for two other species by Crous et al. (2006) and Crous & Groenewald (2010).

Table 1. Comparison of ascospores and the ascal apical ring in *Anthostomella saltensis* and similar species.

Species	Ascospores (all two-celled)						Apical ring (µm)	Source
	Total length (µm)	Brown cell		Hyaline cell	G*	M*		
		Shape	Size (µm)	Size (µm)				
A. sabiniana	14–15	± ellipsoid, one end broadly rounded	12–13 × 6–7	2 × 3	+	+	4 × 3	Francis 1975
	13.5–16	± ellipsoid, wider at base	11.5–14 × 5–7	2–2.5 × 2.5–3	+	–	2–2.5 × 2.5–3	Lu & Hyde 2000
A. clypeata	12–15	ellipsoid	10.5–13 × 5–5.5	1.5–2 × 1.5–2	–	–	1.5–2 × 1.3–1.5	Lu & Hyde 2000; Francis 1975
A. clypeoides	10–14.5	oval-ellipsoid, one end conic	9–13 × 3–5	1–1.5 × 2	–	–	2 × 2	Francis, 1975
	11.5–14	± ellipsoid, one side flattened	10–12.5 × 5–6.5	1.5–2 × 2–2.5	–	+	1.3–1.5 × 2–2.5	Lu & Hyde 2000
A. saltensis	9–14	± ellipsoid, one end narrowly rounded	8–12 × 4–6	1–2 × 1.5–2.5	+	–	2–3 × 1–2.5	This paper

* G = germ slit; M = mucilaginous sheath; +/– = present/absent.

Anthostomella scotina (Durieu & Mont.) Sacc., Syll. Fung. 1: 288. 1882. Plate 2

Ascomata immersed, clustered or solitary, visible as black and conical areas, dome-shaped, in adaxial and abaxial leaf, globose or subglobose in vertical sections, (220–)235–300(–310) × (180–)200–295(–300) µm (x = 258.1 × 248.3 µm, n = 13). Clypeus black (100–)200–255(–280) µm diam. (x = 225.1 µm, n = 13); conical ostiolar papilla 50–98 µm diam. (x = 63.7, n = 13), periphysate ostiolar canal 14–37.5 µm diam. (x = 25.7 µm). Peridium (8–)9–16(–17) µm diam. (x = 13.1 µm). ASCI cylindrical, unitunicate, short-pedicellate, 8-spored, (85–)87.5–117.5 × 4.5–7 µm (x = 101.7 × 5.4 µm, n = 50), apically rounded, with a J+ cylindrical-shaped apical ring (1.5–)2–3-× 1–2 µm (x = 2.4 × 1.3 µm, n = 50). Paraphyses septate, hyaline (3–)3.5–6(–7) µm diam. (x = 4.7 µm, n = 50). Ascospores (20–)21–29(–30) µm total length (x = 25.7 µm, n = 100), fusiform, three cells, with inequilaterally ellipsoidal or cylindrical brown central cell,

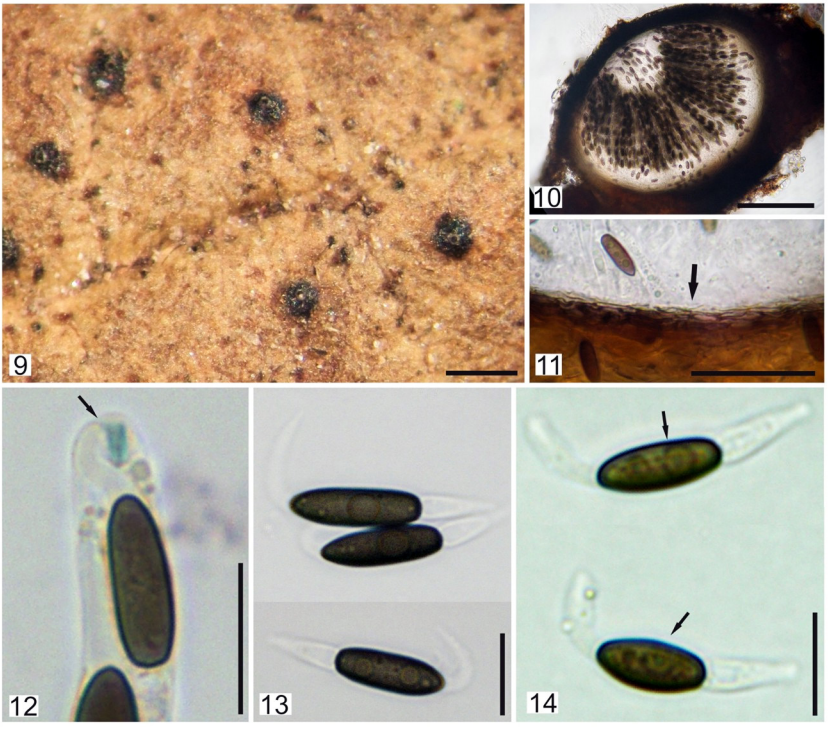

Plate 2 (Figs 9-14). *Anthostomella scotina* (Sir & Hladki 120). 9: Clypei on surface of *Alnus acuminata* leaf; 10: Longitudinal section of immersed perithecium; 11: Peridium (arrow); 12: Ascal apical apparatus; 13: Ascospores; 14: Ascospores showing germ slit (arrows). Bars: 9 = 450 µm; 10, 11 = 100 µm; 12–14: 10 µm.

with one broadly rounded basal end and one narrowly rounded distal end (9–)9.5–14(–15) × (3–)3.5–4.5(–5) µm (x = 11.3 × 4.1 µm), straight and faint germ slit. Hyaline globose basal cell on the widest part of the brown cell (6–)6.5–8(–9) × 2–3 µm (x = 7.4 × 2.5 µm) and hyaline curved distal cell (5–)6–9(–10) × 1–2.5 (x = 7.1 × 1.9 µm), both becoming narrower towards the end, lacking mucilaginous sheath.

Material examined — **ARGENTINA: Catamarca**: Department Aconquija, near road, 13-V-2013, leg. Sir & Hladki 405-406 (LIL). **Jujuy**: Department Ledesma, entering the National Park Calilegua, 12-V-2012, leg. Sir & Hladki 120 (LIL). **Tucumán**: Department Yerba Buena, Cerro San Javier, Memorial Park, Aliso forests, 27-X-2011, leg. Sir & Hladki 366 (LIL); Villa Nougues, near road, 25-XI-2011, leg. Sir & Hladki 362 (LIL); Department Monteros, Las Azucenas, 27-X-2011, leg. Sir & Hladki 364 (LIL); La Heladera, 27-X-2011, leg Sir & Hladki 365 (LIL); Department Chicligasta, Provincial Park El Cochuna, near road, 26-XI-2011, leg. Sir & Hladki 363 (LIL); La Banderita, Aliso

forests, 13-V-2013, leg. Sir & Hladki 404 (LIL); Las Lenguas, Aliso forests, 13-V-2013, leg. Sir & Hladki 403 (LIL); Department Tafí del Valle, near the los Sosa river, 7-VI-2012, leg. Sir & Hladki 361 (LIL). **CHILE: Bío Bío,** Concepción, Caracol, on *Persea lingue*, Jan. 1909, C. Spegazzini (LPS 7098, holotype of *Entosordaria perseicola*).

Hosts — *Alnus* (*Betulaceae*), *Betula* (*Betulaceae*), *Cladium* (*Cyperaceae*), *Lithocarpus* (*Fagaceae*); *Persea* (*Lauraceae*).

Distribution — Algeria, Argentina (Catamarca, Jujuy, and Tucumán provinces), Belgium, Chile, UK, USA (California).

Notes — There are some discrepancies between our ascospores and those described by Francis (1975) and Lu & Hyde (2000). We follow Lu & Hyde (2000) in interpreting the ascospores as 3-celled, while Francis (1975) interpreted the distal hyaline cell as a gelatinous appendage, consequently citing a much smaller "total" spore length; the total ascospore length measured by Lu & Hyde (2000) is similar to ours. The length of the brown cell measured by Francis (1975) is similar to ours, but Lu & Hyde (2000) cite a shorter length. Lu & Hyde (2000) described a very thin gelatinous sheath and absence of a germ slit; whereas both Francis (1975) and we observed a faint germ slit but no mucilaginous sheath.

Provisional key to species of *Anthostomella* from northwestern Argentina

1. Ascospores with a single hyaline basal dwarf cell ..... ***A. saltensis***
1. Ascospores with two hyaline cells **2**
2. Brown cell 9–15 × 3–5 µm, inequilaterally ellipsoidal, hyaline cells 5–10 × 1–3 µm, apical ring cylindrical shaped. ..... ***A. scotina***
2. Brown cell 12–16.5 × 5–7 µm, inequilaterally ellipsoidal, dwarf cells 1.5–2.5 × 2–3 µm apical ring wedge shaped ..... ***A. sepelibilis***

Discussion

Eleven xylariaceous genera have been reported in the protected areas of the Argentine Yungas (Sir et al. 2012) but the only report of *Anthostomella* species from this region is *A. sepelibilis*, cited from Tucumán (Lu & Hyde 2000). Our survey in the Argentine Yungas yielded two additional *Anthostomella* species. The characters of one did not match those of any previously described *Anthostomella.* Its morphology differs enough that the specimens can be described as a new species, *A. saltensis.* Future molecular research will test our hypothesis and contribute more information about the affinities among *Anthostomella* species. The other species found, *A. scotina,* is incorporated into the mycobiota of Argentina.

Anthostomella species are found on the stems and leaves of 82 plant families (Lu & Hyde 2000), but only *A. scotina* was cited on *Betulaceae* (*Betula alba* L., *B. pendula* Roth). Our study reports for the first time an *Anthostomella* species on another genus of this family, *Alnus.*

Alnus acuminata is a tree of great ecological importance for Argentina's Yungas. It is a pioneer species of forest succession, appearing mainly after landslides or large fires (Arturi et al. 1998) and is associated with an unusual and diverse mycobiota. Walker et al. (2012) reported a new member of *Gnomoniaceae* on *Alnus acuminata* leaves from Tucumán (Argentina) and our research added two species of a xylariaceous genus, one new to science and one new to the country.

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